



## Spread of invasive ragweed: Climate change, management and how to reduce allergy costs

**Author(s):** Richter R, Berger UE, Dullinger S, Essl F, Leitner M, Smith M, Vogl G  
**Year:** 2013  
**Journal:** The Journal of Applied Ecology. 50 (6): 1422-1430

### Abstract:

Ragweed *Ambrosia artemisiifolia* L. is rapidly spreading in Europe. Its pollen is highly allergenic, with 4-5% of Europeans being sensitized. There is an urgent need to curtail the further spread to minimize allergy costs. We simulated the spread of ragweed in Austria and southern Germany (Bavaria) until 2050 with particular emphasis on expected climate change. Using different management scenarios and levels of management effort, we analysed the potential for reducing human allergy costs, that is, expenses caused by allergies from ragweed pollen, by curtailing the accelerating spread of ragweed. We accounted for three contrasting climate assumptions: no change in temperature and moderate (annual temperature increase of 0.025 degrees C) and more extreme (annual temperature increase of 0.04 degrees C) climate change. We found that a carefully designed management plan consisting of survey and eradication can drastically reduce the spread of ragweed. Without management, mean allergy costs for the management period (2011-2050) amount to about 290, 335 and 365 million Euro annually under the three climate change assumptions. Following an optimally allocated management strategy with an annual budget of 30 million Euro reduces mean allergy costs by 258, 295 and 325 million Euro per year. Thus, the management may yield substantial savings, in particular under more extreme warming, where total savings over 40 years amount to about 12 billion Euro. **Synthesis and applications.** Our study illustrates that management of invasive alien species has an economic benefit beside natural conservation. We provide guidance for the future management using the example of ragweed in Austria and Bavaria and show that although the species has expanded its range and abundance substantially in recent years, a well-designed and ambitious management programme still may yield substantial benefits. This is true for current climatic conditions as well as for future climate change scenarios, albeit management costs increase with a warming climate. However, possible gains are increasing in parallel. Given the scale of impacts on human health, and the substantial gains accrued from management, our results suggest that it is wise to halt further spread of ragweed.

**Source:** <http://dx.doi.org/10.1111/1365-2664.12156>

### Resource Description

#### Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Other Climate Scenario

**Other Climate Scenario:** SRES A1B

# Climate Change and Human Health Literature Portal

## **Exposure :** ☒

weather or climate related pathway by which climate change affects health

Air Pollution, Temperature

**Air Pollution:** Allergens

**Temperature:** Fluctuations

## **Geographic Feature:** ☒

resource focuses on specific type of geography

None or Unspecified

## **Geographic Location:** ☒

resource focuses on specific location

Non-United States

**Non-United States:** Europe

**European Region/Country:** European Country

**Other European Country :** Germany; Austria

## **Health Co-Benefit/Co-Harm (Adaption/Mitigation):** ☒

specification of beneficial or harmful impacts to health resulting from efforts to reduce or cope with greenhouse gases

A focus of content

## **Health Impact:** ☒

specification of health effect or disease related to climate change exposure

Respiratory Effect, Other Health Impact

**Respiratory Effect:** Upper Respiratory Allergy

**Other Health Impact:** allergic diseases

## **Mitigation/Adaptation:** ☒

mitigation or adaptation strategy is a focus of resource

Mitigation

## **Model/Methodology:** ☒

type of model used or methodology development is a focus of resource

Cost/Economic, Exposure Change Prediction

## **Resource Type:** ☒

format or standard characteristic of resource

Research Article

## Timescale: ☒

time period studied

Medium-Term (10-50 years)